QUARTERLY PERISCOPE.

FOREIGN INTELLIGENCE.

ANATOMY.

1. *Remarks upon the Anatomy of the Mucous Glands of the Small Intestines.* By F. Lelut.—The older anatomists, for example, Galen, Vesalius, Riolanus, Willis, Glisson, &c., referring to the theories of the time, all that was known of the structure and uses of different parts, and regarding the sub-diaphragmatic digestive mucous membrane as an organ of secretion, supposed that it contained glands in its tissue, or indeed that it was itself entirely glandular. At a later period, this view of it seemed to be confirmed by the microscopical researches of Lieberkuhn, who transformed into glands the villosities of the gastro-intestinal mucous membrane. But there is a wide difference between this designation, in some degree theoretical, and a correct anatomical investigation of them; and Willis and Pechlin may be considered amongst the first anatomists who described with correctness the mucous follicles of the alimentary tube, and regarded them in their proper light; yet their plates represent them only as they are to be met with upon the exterior surface of the intestine. Since their time, Malpighi, Duverney, Wepfer, and a number of others, but particularly Peyer, have described with so much exactness these little organs, that their observations will serve as a basis to all future researches that may be made upon this subject.

The glands of the small intestines are, next to the follicles of the large, of all those of the digestive tube, the most simple in their composition. This is particularly the case when we compare them with those of the duodenum. We might with propriety represent them as mere *crypts* or *follicles*, or as nothing more than simple reduplications of the mucous membrane, the parietes of which contain glandular matter in scarcely an appreciable quantity; whilst their bases attach, or rather lose themselves in the nervous tunic of the intestine. This general view of the composition of a follicle is the basis of the theory of Malpighi, and is the one which, according to his own statement, he applies to the structure of the viscera in general.

The intestinal glands, when examined in reference to each other, present themselves under two principal and opposite forms; they are either isolated or grouped together in numbers; and in the latter case, the form of the group, according to Peyer, is generally oval or almond-shaped. But these two forms are often blended together, and in the case where the gland appears to be completely isolated, it is very unusual for us not to find upon examination several orifices, and of course several follicles collected together in a group. This is more readily seen when the intestine examined is in a pathological state, in which case these glands are greatly developed, their cavities filled with an unusual quantity of mucus, and the circumference of their orifices distinguished by a blackish spot, as Melanique, Rœderer, and Wagler have beautifully delineated. Besides these follicles, more or less isolated, or collected in groups of two or three only, and the ovoid plates, the largest of which are from three to four inches in length; there are other groups varying in shape and size, discoverable. Some of these are perfectly circular, others polyangular, whilst others again resemble two ellipses connected to each other by one of their sides.

Agglomerated follicles. The appearance which these glandular agglomerations present with respect to the development of their cryptæ, is not always the same. That which seems to me to be most usually met with, and most natural, is where the plate appears to be composed of a multitude of small points nearly circular, of about the sixteenth or tenth part of a line in diameter, separated from each other by thin membranous septæ of the same breadth, which causes these groups to resemble very much in appearance a piece of lace. These are the reticulated plates which modern writers have mistaken for pathological changes. These circular points are nothing more than the orifices of the glands, the bodies of which are in contact with each other beneath the mucous membrane. When we examine them by transmitted light, they become more visible, because the intestine in this spot is thinner, and we may frequently, especially in new-born children, introduce the point of a fine needle, or hog's bristle into them. We may also by pressure force out from their extremities small drops of mucus, very small to be sure, but nevertheless sufficiently manifest. If this result is more rarely observed, when the experiment is made with the isolated follicles, (at least when there is a pathological development of them,) it may possibly be attributable to the contraction of the mucous membrane, by which the orifice of the follicle is stopped up; whilst in the plates, the adhesion of the glands to each other prevents the membrane from so contracting, and in this way keeps their orifices open.

The agglomerated glands of the intestine often present themselves under a more simple form than the preceding, but which seems to me to be as certainly normal: although it may be mistaken for superficial ulceration of the mucous membrane, or for the cicatrix of some previous ulceration. In this form the plate presents in truth the appearance of net-work, the meshes of which are very large and formed of extremely tenuous threads. It seems, in this instance, that the mucous membrane is but barely depressed to form these cryptæ. It is a collection of very small, scarcely perceptible circular depressions, the bottoms of which correspond in size with their orifices, and which bear a striking analogy to the cellules that Ruysch observed in the mucous membrane of the stomach, and to those that Santorini describes as occurring in the duodenum, and which I have observed twice in the same situation.

To the two preceding forms may be added or opposed a third, which may perhaps be equally as normal, but which for the most part should, I believe, be attributed to an unusual development of the glands constituting the plate. This is here very much raised above the level of the mucous membrane, and may be either regular or irregular in its form. These follicles have become in some instances very much enlarged, and their orifices often so much obstructed, that the employment of desiccation, or any other means in our power, will be insufficient to make them manifest. Sometimes several in the same plate are very much increased in size, and as it seems, at the expense of the others; these orifices in these cases are easily distinguishable.

The *colour* of the glands of Peyer is generally whiter than that of the rest of the mucous membrane. Occasionally in the same, or in different intestines, and without these viscera being ostensibly in a pathological state, I have seen them offer a variety of tints. I have met with them grayish, bluish, brownish, greenish, and in the latter instance coloured by bile, which rendered the orifices of their constituent follicles more apparent. Their number is variable. Peyer reckons from ten to forty. Meckel gives as a medium number thirty; M. Louis from twenty to thirty. All these different valuations are correct; but their number may very much exceed, or not come up to the numbers stated. Several times I have been able to count from fifty to sixty of these plates or discs; and Brunner seems to have made some observations of a similar nature. At other times I have found but eight, five, two, one, and in a solitary case, that of a new-born child, I was unable to discover a single one. Peyer met with a similar case, that of a hydrocephalic infant. With a little care it is extremely easy to make a correct estimate of the follicular plates of the small intestine; the only difficulty that presents itself occurs at the commencement of the jejunum, where the valves are very much crowded together and greatly developed. But the error will not be very great, for it is in this intestine that these plates are least common, and often do not exist at all. Peyer however speaks of a circular follicular plate, existing in the middle of the duodenum, and has given a sketch of it. Pechlin and Brunner have observed the same thing; and I myself have met with three cases in which it existed. I have also seen several examples of the plates commencing with the jejunum, and in other cases I have discovered the first plate at only a few feet from the valve of Bauhin; but in the majority of cases they commence about the termination of the first third or half of the jejunum, and are more or less crowded together in proportion to their numbers and length. The last few inches of the small intestine, and the superior surface of the valve of Bauhin, are in many instances nothing more than one vast follicular plate.

Peyer, Morgagni, Haller, Meckel, all anatomists have, and with propriety, described these glands as situated upon that surface of the intestine which is opposite to the attachment of the mesentery. I thought in two instances that I had discovered an exception to this arrangement, but a more minute examination convinced me that the group merely bordered upon the edge of this insertion. In dividing with an entérotome the intestine of a cat, along the line of this insertion, I cut in two a large follicular plate. This is the only case of the kind I have ever met with.

Winslow believed that the valves of Kerkringius did not stop on a level with the plates. Peyer, Haller, M. Billiard, and M. Louis contend that they do, and their opinion is nearer the truth. In fact, when we examine the relations of these two different organs one with another, we must be of necessity struck with the sudden diminution in size of the valvulæ conniventes in the neighbourhood of the agglomerate glands. But it is merely a diminution, and not an entire disappearance, as was formerly erroneously taught by Peyer. In the jejunum where the valves are very numerous, this is sufficiently manifest. These folds, though extremely attenuated, nevertheless traverse the plates, and contain follicles in their thickness. In the ileon, particularly towards its termination, they have almost entirely disappeared, seeming to finish in the neighbourhood of these plates; but when the intestine is coloured by the bile, they may easily be distinguished as lines of a deeper yellow than the surrounding tissue.

With regard to their *seat* in the thickness of the intestinal tunics, the agglomerated glands occupy in some sort a medium position, between those of the stomach, which form as it were part of the mucous membrane, and those of the duodenum, which are situated in the thickness of the cellular tunic, and sometimes upon the outside of it. The glands of the small intestine occupy in fact a position between the mucous and nervous coats, as Willis, Duverney, Wepfer, Peyer, Harder, Verhegen, Haller, Rœderer, and Wagler have stated. It is very easy to separate the intestinal tube into two canals, one of which is formed of the peritoneal and muscular coats, by their adhering to each other; the other of the mucous and cellular. All these glands are contained in the latter canal, and may readily be seen through the nervous coat. Should they be a little more developed than usual, they form a sort of mellonated or nodular mass, resembling somewhat the exterior surface of the vesiculæ seminalis. In this state, if we dissect them from their external surface towards their internal, we perceive that their tissue confounds or blends itself with the internal face of the nervous tunic, forming in some sort a part of it; whilst the superficial portions of their bodies and their orifices are formed by the mucous tunic.

The number of follicles constituting a plate has been variously estimated; thirty, fifty, sixty, or even more, are the numbers given by different authors on this subject. I am able to affirm that they exist in much greater numbers, and the desiccation of one of these plates upon a piece of glass exhibits them to an extent really wonderful. In some plates in which, when examined in the recent state, I could discover but fifteen or twenty distinct orifices, and from one hundred and fifty to two hundred glandular grains, desiccation has demonstrated the existence of at least a thousand follicles. In a plate thirteen lines in length, by two or three in width, I have counted nearly five hundred. In another, seven lines long by two broad, from one hundred and twenty to one hundred and forty. In a circular plate of a line in diameter, from eight to ten. I have all these different pieces, and several drawings taken from dried preparations exhibiting the same thing.

The proper tissue of the glands of the small intestine is sometimes very soft, and as pale as that of the mucous membrane, from which it is not always distinguishable.

After desiccation, each one of these follicles presents itself in a detached condition upon the proper tissue of the intestine, and presents a whitish appearance. They are roundish or oval, and about one-third or one-fourth of a line in diameter; in general they touch each other; sometimes, however, they are perfectly isolated in each disc or plate, and their orifices which have been rendered patulous by drying, are often very evident.

Isolated follicles. Their form, their nature, their disposition in the intestinal tunics, being similar to that of the follicles agglomerated in plates, all that we have to consider at present, is their number and position upon the internal surface of the intestine.

It has been already remarked, that these isolated follicles are but a continuation of the glands of the duodenum, but there exists between the two many distinguishing marks. The glands of the duodenum are always to be met with; their number could scarcely be greater than it is, and they form in most instances a true glandular tunic. They are very thick, and already perfectly visceral, especially about the pylorus. Their tissue is reddish, they are seated in the thickness itself of the nervous coat, and often also upon the outside of it; they cease almost always in a somewhat abrupt manner, about the termination of the ductus choledochus and ductus pancreaticus, &c. &c. Often on the contrary, not only the termination of the duodenum, and of the jejunum itself, offers no traces whatever of isolated follicles, but none are perceptible in the whole of the small intestine. When they are met with, unless morbidly developed to a considerable extent, they are much more blended with the mucous membrane than those of the duodenum. They are also much smaller, their tissue much paler, much softer, much less glandular, &c.

The number, the existence even of these isolated glands of the small intestine, are therefore circumstances by no means fixed. When the plates of Peyer exist in the most perfect state of simplicity, it is by no means uncommon for us to be unable to discover a single isolated follicle, or at most a few here and there, which desiccation alone renders visible. They are particularly evident in those cases in which the glands are in a state of turgescence, or else in the neighbourhood of plates in a pathological condition. Rœderer and Wagler have observed this development of the isolated cryptæ in the jejunum of those dead of acute mucous fever. In some cases, and I have seen many examples of the same thing, these cryptæ exist in large numbers, and are exceedingly well-marked in cases where the plates are but rarely perceptible, and where they exist in the most perfectly normal condition. In similar cases, where I have examined different portions of intestine after desiccation, I have counted from eighty to one hundred of these isolated glands in the space of a square inch. Some of the dots which marked their position were extremely small, but nevertheless perfectly demonstrable.

For the most part, the isolated follicles are to be met with in the interspaces of the valvulæ conniventes; they, however, in some cases, also occupy the surface of the valves themselves. Rœderer and Wagler have given a case of this kind, as a type of several others which they have met with. With respect to what remains to be said of these glands, we may simply state that they correspond in all respects with those of Peyer. They are in general more numerous as we approach the termination of the intestine. Peyer has met with them upon the upper border itself of the valve of Bauhin, and every one may satisfy himself of the correctness of this observation. They are, on the contrary, with difficulty discoverable in the upper part of the jejunum, on account of the size and close proximity of the valvulæ conniventes in this intestine; and in most instances, for us to be able to see them in the recent state, it is necessary that some pathological development should have rendered them more apparent than usual.

The isolated follicles are situated indiscriminately over the whole circumference of the intestine, upon the line even corresponding to the attachment of the mesentery. This constitutes a distinguishing characteristic between them and the glands of Peyer, and possibly explains the cause of our finding in some instances ulceration existing over the mesenteric insertion.

In *new-born children*, as well as in the fœtus of seven or eight months, Peyer remarks as a general rule, that all the glands of the digestive mucous membrane are as constantly to be met with, and are found in as large numbers as in the adult. Another fact which appears to me to be as general, is, that these glands considered separately, are often as large in the infant as in the adult; and in every instance are not more than one-third or one-half less voluminous, notwithstanding the size of the infant does not more than equal the fourth part of that of the adult; and that its alimentary tube in proportion is not much greater. We should also remark, in the third place, that the digestive mucous glands in the infant, even when they are grouped together, are more isolated, more distinct, and have their excretory orifices more appreciable than in the adult.

In the infant, the number of follicles in each plate or group, at least equals the number met with in the adult, and the plates themselves exist also in as large numbers. These last, the plates, in the infant of some weeks old, say from three to four months, have several times been found of more than two inches in length, whilst in the adult, the glands of Peyer of the largest size are not more than from three to four inches in extent; and in most instances much less. For the most part it is impossible to distinguish them by their length from those of the infant.

It results from these observations, that, relatively to the length of the small intestine, or length which is proportionate to its circumference, that the number of follicular groups in the new-born child is almost four times as great as in the adult; and that the sum total of their cryptæ is nearly three times as large. The lower orders of the mammalia, those at least which I have examined, also exceed man in the number of their mucous intestinal follicles, but in a lesser proportion. Nevertheless, in man, the sum total of these follicles of the small intestine is immense. Thirty glandular bodies, each containing as a medium number five hundred follicles, make when multipled together fifteen thousand. We find in some cases one hundred, and always at least fifty of the isolated follicles contained in a square inch of intestine. The surface of the small intestine having almost five hundred times this extent, (that is, it contains about five hundred square inches,) gives when multipled by fifty, twenty-five thousand as the whole number of isolated cryptæ; if we add to this the fifteen thousand agglomerated follicles, we have as a result forty-thousand, which may be considered as the whole number of mucous glands contained in the small intestine.

I have given perhaps somewhat too high an estimate of these different glands, and I have given it in fixed numbers, for the purpose of more effectually directing attention to the immense number of mucous glands contained in the small intestine. Their numbers attracted the notice of the old anatomists, and they have in consequence attributed to these organs some important agency, either in the performance of the functions, or in the productions of the diseases of the intestinal tube. Willis, Swammerdam, Glisson, Cole, Jean de Muralt, believed that the glands of the small intestine were concerned in a manner more or less exclusive in the elimination and absorption of the chyle. Peyer sometime ago overthrew this doctrine. He as well as Duverney suppose that the substance secreted by these organs performs in the small intestines the office of the bile and pancreatic juice in the duodenum; that is to say, it serves to separate the chyle from the stercoraceous matter in this portion of the intestinal tube, and assist moreover in the more rapid expulsion of the latter. This view of the subject is most generally and exclusively adopted by modern physiologists.—*Gazette Médicale, June*, 1832.

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2. *Anatomy of the Optic Nerves.*—M. Ozanam, of Lyons, has minutely investigated the origin and course of the optic nerves, in the ox and in the human species. It results from his researches that they arise from the centre of the nates, from which they pass out as a small white filament. In the ox this filament is sent off from the anterior part of the tuberculi quadrigemini; it is composed of extremely delicate fibrous fasciculi, which pass over the anterior border of the optic thalami and unite to the external corpus geniculum. From thence the two nerves disengage themselves, and become round as they proceed towards the orbits, they afterwards contract adhesions with the tuber cinereum. Arrived at the sella turcica, they form a kind of H, by approximating one to the other, so as to appear to be confounded together, afterwards they diverge to pass to the globe of the eye. These two nerves, which appear united, are nevertheless separated by a portion of very thin membrane, which is a production of the dura mater; it forms a species of sac, full of a white medullary substance, of the colour of cream. This disposition may be seen, by placing this portion of the optic nerves upon a block of black, polished wood, and gradually separating them with a blunt knife after having fixed the four extremities of the nerves. To still further prove this, M. Ozanam placed the second pair of nerves taken from a subject who had died of acute encephalitis, between two pieces of glass, and examined them with a solar microscope. The nerves were cut off three lines before they enter the sella turcica and six lines beyond this point. The spectrum of this portion of the nerves appeared in the proportion of six feet in length, to three in breadth; the two nerves appeared to be eight inches in circumference, and the membrane or intermediate sac two feet large; the whole of the image occupied an area of eighteen square feet.

Each nerve appeared formed of an infinity of small fasciculi or tubes in juxtaposition; it was edged externally only by a kind of fringe, two inches long. The posterior portion of the connecting membrane presented a similar one. These fringes did not exist either at the inferior or anterior portions of the membrane, nor at the extremities of the nervous trunks, it could not therefore be the effect of the section made by the scalpel, and moreover all the parts divided by the instrument, were smooth and even.

It results from this experiment, that the optic nerves do not cross upon the sella turcica. We may believe however, that these nerves if they have not at their origin a decussation of medullary fibres in the optic thalami, have at least a mediate communication by the cerebral pulp and the vessels which nourish them. This communication between the two nerves may also occur on the sella turcica, by that species of small reservoir of medullary fluid, included in the membrane above described, for it is presumable, says M. Ozanam, that this reservoir and the fluid it contains are not without its use.—*Archives Générales, May*, 1832.